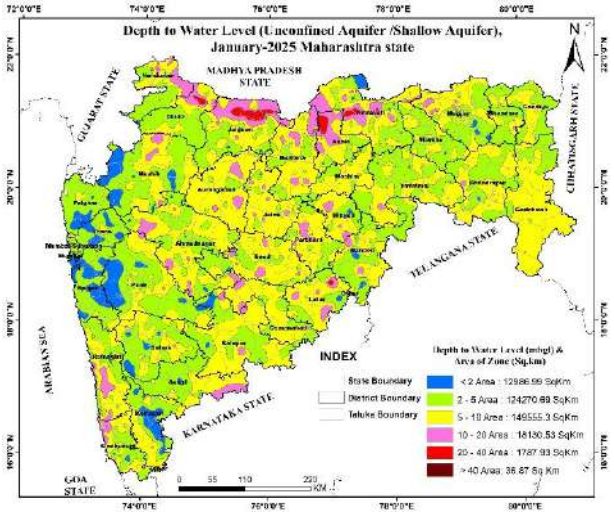
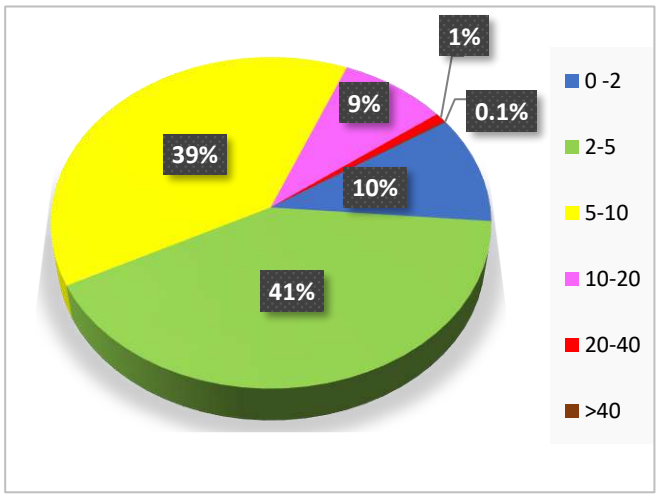
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION





GROUND WATER LEVEL BULLETIN

January-2025

Maharashtra

ABSTRACT

Ground water level Scenario during January 2025 highlights the findings, status of ground water level in different aquifers and its seasonal, annual and decadal comparison.

CENTRAL GROUND WATER BOARD
CENTRAL REGION,
NAGPUR

1. INTRODUCTION

Since 1969, the Central Ground Water Board (CGWB) monitors ground water levels all over the country four times a year during January, May, August and January. A Groundwater bulletin has been prepared by CGWB depicting changes in groundwater regime of the country through different seasons. It is an effort to obtain information on groundwater levels through representative monitoring wells. The natural conditions affecting the groundwater regime involve climatic parameters like rainfall, evapotranspiration etc., whereas anthropogenic influences include pumping from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc. This continuous monitoring provides a valuable tool to decipher the seasonal and long-term changes in ground water levels, and in turn helps in managing the ground water resources in a more scientific and effective manner.

2. STUDY AREA

The State of Maharashtra occupies the west-central part of India. It lies between latitudes 15°45' to 22°00' N and longitudes 73°0' to 80°59' E **(Fig.1).** Maharashtra, the third largest state in India has a total geographical area of 3, 07,713 sq km with 9.4 % of the country area. It is bound on the north by Gujarat, north-east and east by Madhya Pradesh, south-east and south by Telangana, south-west by Karnataka and Goa and in the west by the Arabian Sea. Administratively, the state is governed by 36 districts which are grouped into six divisions namely Konkan, Pune, Nashik, Chatrapati Sambhaji Nagar (Aurangabad), Amravati and Nagpur. The State is further divided into five regions namely Konkan, Western Maharashtra, Khandesh, Marathwada and Vidarbha. Total population of the State is 112.37 million out of which 50.81 million (45.21%) is urban and 61.56 million (54.78%) is rural. The average density of population is 365 persons/km^2. The overall growth in total population during decade is ~15.99 % (2001 to 2011 census).

Central Ground Water Board, Central Region, Nagpur has set up a network of 2175 observation wells known as the Ground Water Monitoring Wells (GWMW's) located all over Maharashtra which comprises of 1857 dug wells and 318 piezometers. The average density of Monitoring stations is 141 Km^2/well.

Physiographically, the state can be divided into 3 units namely Sahyadri Range (Western Ghats), the Western Coastal Tract (Konkan), and the Eastern Plateau (Deccan Plateau). Godavari, Krishna, Tapi, Mahanadi, Narmada and Coastal Basins are the Major River basins in the State. About 75% area of Maharashtra is drained by eastward flowing rivers, viz., the Godavari and Krishna draining into the Bay of Bengal, the remaining 25%

of the area is drained by westward flowing rivers, viz., Tapi and Konkan coastal rivers, draining into the Arabian Sea. 45% of state's water resources are from West Flowing Rivers which are mainly monsoon specific rivers emanating from the Ghats and draining into the Arabian Sea. ~53 % of network stations fall in Godavari basin, 16 % fall in Tapi, 16% fall in Krishna, and 15 % network stations fall in the Coastal basins.

~82 % area of the State (2,49,934 sq km) is covered by Deccan trap basalts, whereas rest of area is covered by Quaternary alluvium (14,526 sq km; 4.7 %), Gondwanas (4800 sq km; 1.6 %), Precambrian (Vindhyans, Cuddapahs, and Kaladgi group of rocks - 6,217 sq km; 2%) and Archaean's (32,235 sq km; 10.5%). The aquifers are grouped under three major hydrogeological groups namely unconsolidated, semi-consolidated and consolidated and nine different types of hydrogeological sub-groups based on geological age and hydrogeological characters.

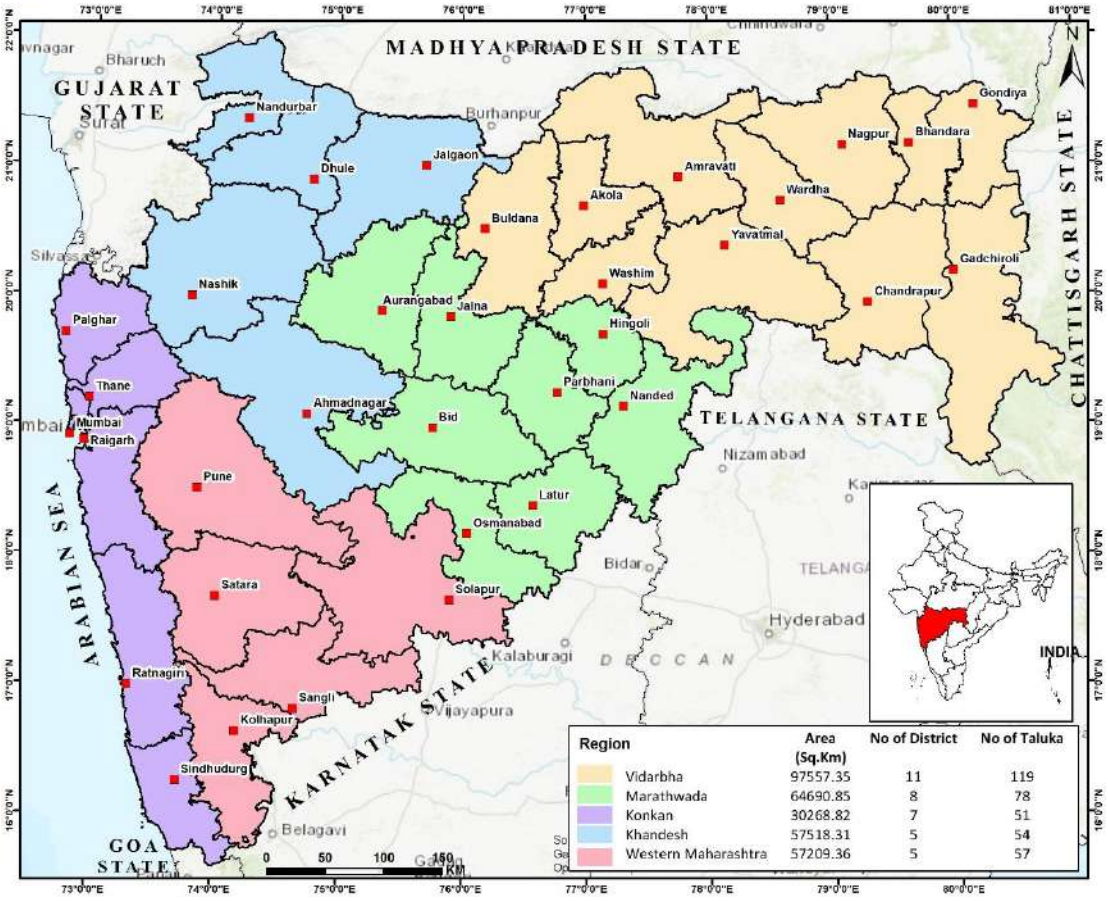


Fig.1: Location & administrative division, Maharashtra state.

3.0 GROUND WATER MONITOIRNG

Central Ground Water Board, Central Region, monitors ground water levels four times in a hydrological year (August, January, January and January) through a network of 2175 Ground Water Monitoring Wells (GWMW) (DW: 1857 & Pz: 318) spread all over the State (**Fig. 2).** The

long-term data generated during monitoring is essential for computation, evaluation and analysis of ground water utilization and its availability.

During the month of January-2025, 2111 GWMWs (DW: 1820; Pzs:291) were monitored over entire Maharashtra, However, 64 wells could not be monitored due to various unavoidable reasons like inaccessibility, lock jam, outside water added, well filled up, well fitted with pump etc. The district wise status of GWMWs for the month of January 2025 is presented in **Table 1** and location of GWMWs is shown in (**Fig. 2)**.

Table-1: District wise status of GWMWs January-2025.

S. No.	District	Active		Dry		Wells Not Monitored		Total wells		
		DW	BW	DW	BW	DW	BW	DW	BW	Total
1	Ahmednagar	78	11	1	1	1	0	80	12	92
2	Akola	25	6	0	0	1	1	26	7	33
3	Amravati	85	12	0	0	6	4	91	16	107
4	C. Sambhaji Nagar (Aurangabad)	50	4	0	0	0	1	50	5	55
5	Beed	64	1	1	0	0	0	65	1	66
6	Bhandara	30	2	0	0	1	2	31	4	35
7	Buldhana	69	52	0	0	2	1	71	53	124
8	Chandrapur	62	10	0	0	2	2	64	12	76
9	Dhule	37	6	0	0	0	0	37	6	43
10	Gadchiroli	43	4	0	0	0	0	43	4	47
11	Gondia	18	8	0	0	1	0	19	8	27
12	Hingoli	28	0	0	0	1	0	29	0	29
13	Jalgaon	62	5	0	0	0	0	62	5	67
14	Jalna	49	6	0	0	0	0	49	6	55
15	Kolhapur	41	4	0	0	0	0	41	4	45
16	Latur	41	6	0	0	0	1	41	7	48
17	Mumbai City	6	0	0	0	0	0	6	0	6
18	Mumbai Suburban	19	0	0	0	0	0	19	0	19
19	Nagpur	158	32	0	0	1	1	159	33	192
20	Nanded	54	1	0	0	2	1	56	2	58
21	Nandurbar	22	4	0	0	0	0	22	4	26
22	Nashik	71	7	0	0	0	0	71	7	78
23	Dharashiv (Osmanabad)	38	2	0	0	1	1	39	3	42
24	Parbhani	44	2	0	0	3	0	47	2	49
25	Pune	65	5	0	0	2	0	67	5	72
26	Raigad	49	1	0	0	0	0	49	1	50
27	Ratnagiri	63	18	0	0	2	0	65	18	83
28	Sangli	38	16	0	0	2	4	40	20	60

S. No.	District	Active		Dry		Wells Not Monitored		Total wells		
		DW	BW	DW	BW	DW	BW	DW	BW	Total
29	Satara	50	3	0	0	4	1	54	4	58
30	Sindudurg	58	15	0	0	0	1	58	16	74
31	Solapur	52	7	0	0	3	1	55	8	63
32	Thane & Palghar	66	2	0	0	0	0	66	2	68
33	Wardha	59	8	0	0	2	2	61	10	71
34	Washim	47	5	0	0	0	1	47	6	53
35	Yavatmal	77	25	0	0	0	2	77	27	104
	Grand Total	**1818**	**290**	**2**	**1**	**37**	**27**	**1857**	**318**	**2175**

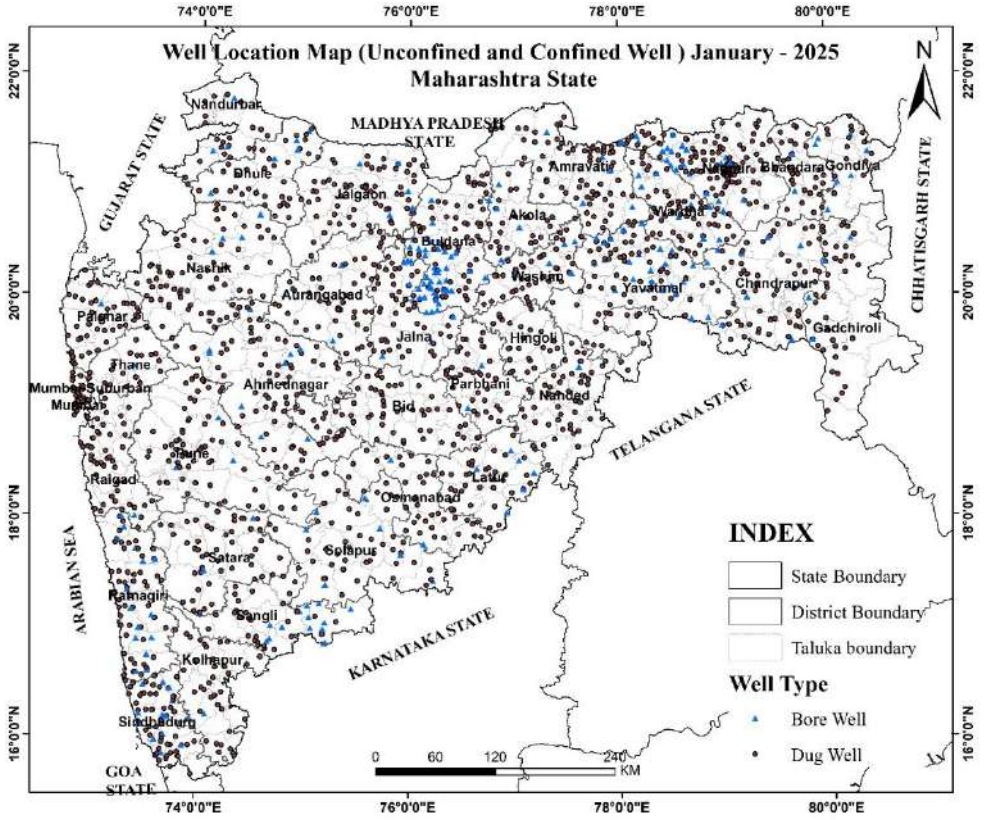


Fig.2: Ground Water Monitoring Wells (GWMWs), Maharashtra.

4.0 RAINFALL

As per the IMD, the departure of monsoon rainfall from normal rainfall for the period from 1st June 2024 to 30th September 2024 in 36 districts of Maharashtra has been considered to correlate the prevailing ground water level scenario. It is observed that out of 36 districts, 22 district received excess rainfall, Hingoli district received deficient rainfall and remaining 13 districts received normal rainfall during this period (**Table-2 & Fig. 3**).

Table-2: District wise departure of rainfall with respect to Normal rainfall (01-06-2024 to 30-09-2024).

Sl.No.	District	% Departure of Rainfall wrt Normal Rainfall	Category
1	Ahmednagar	49	Excess
2	Akola	13	Normal
3	Amravati	-2	Normal
4	Aurangabad	19	Normal
5	Beed	29	Excess
6	Bhandara	13	Normal
7	Buldhana	24	Excess
8	Chandrapur	14	Normal
9	Dhule	37	Excess
10	Gadchiroli	25	Excess
11	Gondia	8	Normal
12	Hingoli	-35	Deficient
13	Jalgaon	46	Excess
14	Jalna	31	Excess
15	Kolhapur	45	Excess
16	Latur	37	Excess
17	Mumbai	18	Normal
18	Mumbai Suburban	33	Excess
19	Nagpur	11	Normal
20	Nanded	15	Normal
21	Nandurbar	36	Excess
22	Nashik	44	Excess
23	Osmanabad	23	Excess
24	Palghar	32	Excess
25	Parbhani	32	Excess
26	Pune	43	Excess
27	Raigad	21	Excess
28	Ratnagiri	26	Excess
29	Sangli	48	Excess
30	Satara	15	Normal
31	Sindhudurg	40	Excess
32	Solapur	12	Normal
33	Thane	12	Normal
34	Wardha	29	Excess
35	Washim	16	Normal
36	Yavatmal	29	Excess

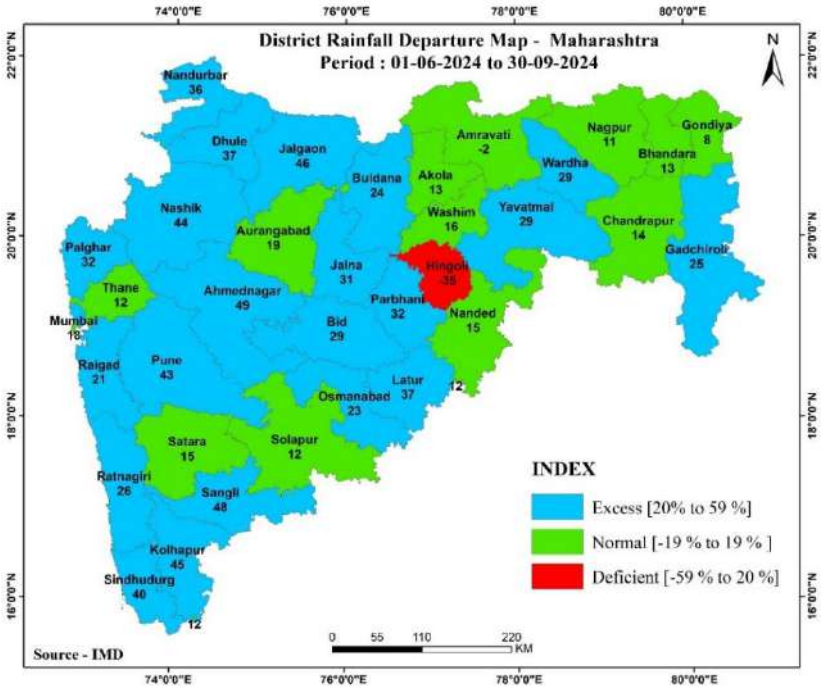


Fig. 3: Rainfall deviation (June to Sept 2024) from normal rainfall.

5.0 GROUND WATER LEVEL SCENARIO (JANUARY 2025)

5.1 SHALLOW AQUIFER (UNCONFINED)

5.1.1 DEPTH TO WATER LEVEL

Depth to water level in unconfined Aquifer (January 2025)

The depth to water level data of 1918 wells is used for the analysis. Depth to water level in shallow unconfined aquifer ranges from near ground level 0.01 mbgl (Pune district) to 48.80 mbgl (Jalgaon district). Water level of < 2 mbgl is recorded in 10% of wells, between 2 to 5 m in 41% of wells, between 5 to 10 m in 39 % of wells, between 10 to 20 m in 9 % of wells and water level more than 20 m is registered in 1% of wells **(Fig. 4)**.

Water levels <2 mbgl are observed in 10% of wells covering about 12,987 sq km area covering mainly in parts of Raigad, Thane, Pune, Palghar and Nashik districts. Water levels between 2 and 5 mbgl covering an area of ~1,24,271 sq km are observed in 41% of wells covering part of almost all the districts of Konkan, Western Maharashtra, Khandesh and Vidarbha regions. About 39 % of wells, covering an area of ~1,49,555 sq km. show water level in the rages of 5 to 10 mbgl. Depth to water levels in this range are observed in major parts of all the districts of Marathwada region; parts of Ratnagiri and Sindudurg districts of Konkan region; Solapur district of Western Maharashtra region; Gadchiroli, Nagpur, Amravati, Washim, Buldhana, Akola and Yavatmal districts of Vidarbha region.

Deeper ground water levels ranging from 10 to 20 mbgl are observed in ~9% of wells covering ~18,131 sq km area of the state and are observed

in northern part of State covering Tapi and Purna River basins of Nandurbar, Dhule, Jalgaon, Buldhana, Akola and Amravati districts. Apart from this, isolated small patches are also observed in almost all the districts of Marathwada region and Ratnagiri, Sindudurg, districts of Konkan region and Ahmednagar district of Khandesh region. Depth to water levels >20 mbgl (1% of wells) covering ~1825 sq. km area is observed in northern part of state occupied by Tapi and Purna alluvium basin in parts of Jalgaon, Akola, Dhule and Amravati districts **(Fig. 5)**.

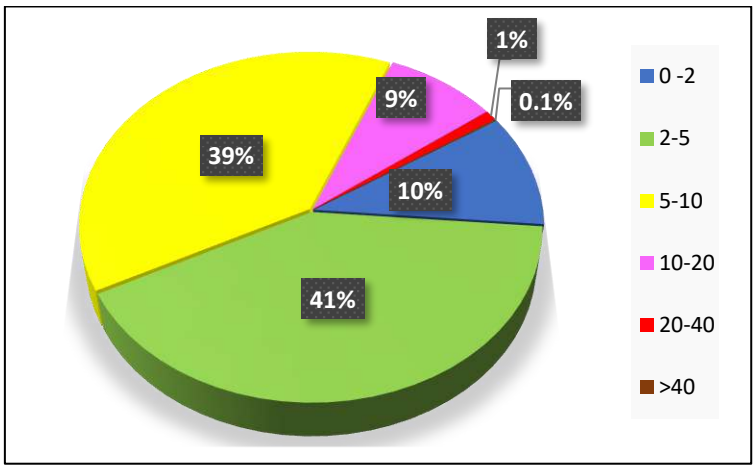


Fig. 4: Percentage of wells in different water level ranges in unconfined aquifer.

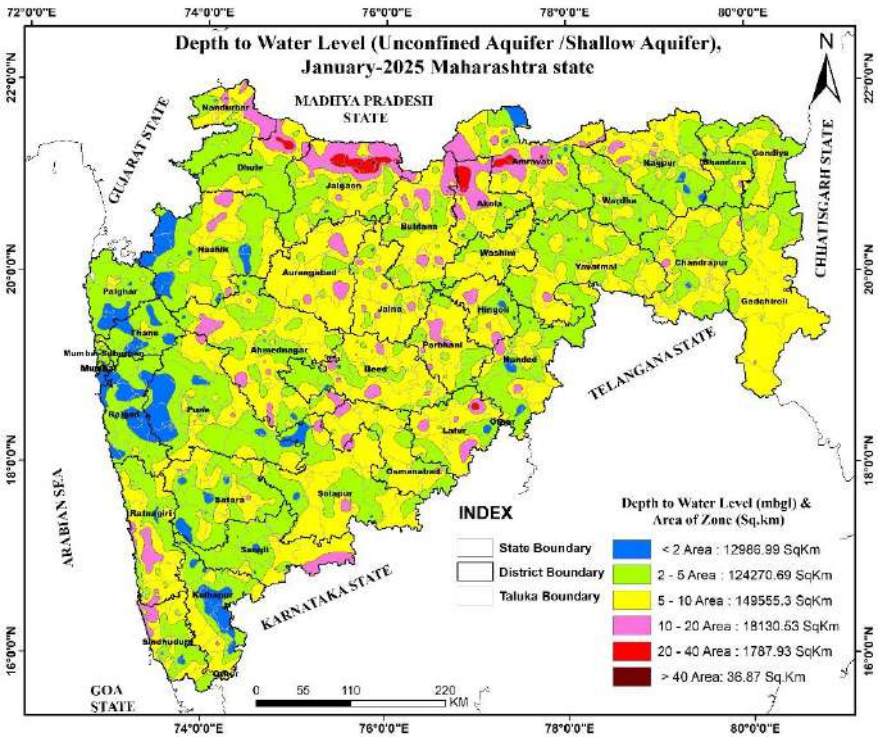


Fig. 5: Depth to Water Level of unconfined aquifer during January 2025.

5.1.2 SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water level in Unconfined Aquifer (January 2025 WRT November 2024)

Water Levels from 1880 stations were compared with that of November 2024 to know the seasonal changes in ground water in January 2025 and found that ~14% of wells have recorded a rise in water level and the remaining 85% of the wells have recorded a fall in water level. About 1% of the wells showing no fluctuation **(Fig. 6)**.

Rise in Water Levels:

About 14% of wells covering 22,985 Km^2 show a rise in water level in the range of 0 to > 4 m. Out of which 12% of the wells show a rise in water level up to 2m, 1% show fall in the range of 2-4 and 1% of show a fall in the range of >4 m. Fall in water level is observed in isolated small parts of almost all the districts of state **(Fig.7)**.

Fall in Water Levels:

About 85% of wells covering ~ 2,83,783 Km^2 area show a decline in water level in the range of 0 to >4 m covering major part of the state. The decline in water level may be attributed to exploitation of ground water resources during Rabi season. Decline in water level < 2 m was observed in 52% of wells covering about 1,73,305 Km^2 area. It is observed in major parts of the state. Decline >2m was observed in 33% of wells covering 1,10,477 Km^2 area. It is observed in major parts of almost all the districts of Marathwada region; Chandrapur, Gadchiroli, Buldhana and Washim districts of Vidarbha region; Solapur districts of Western Maharashtra region and parts of Jalgaon, Dhule, Nandurbar and Ahmednagar districts of Khandesh region.

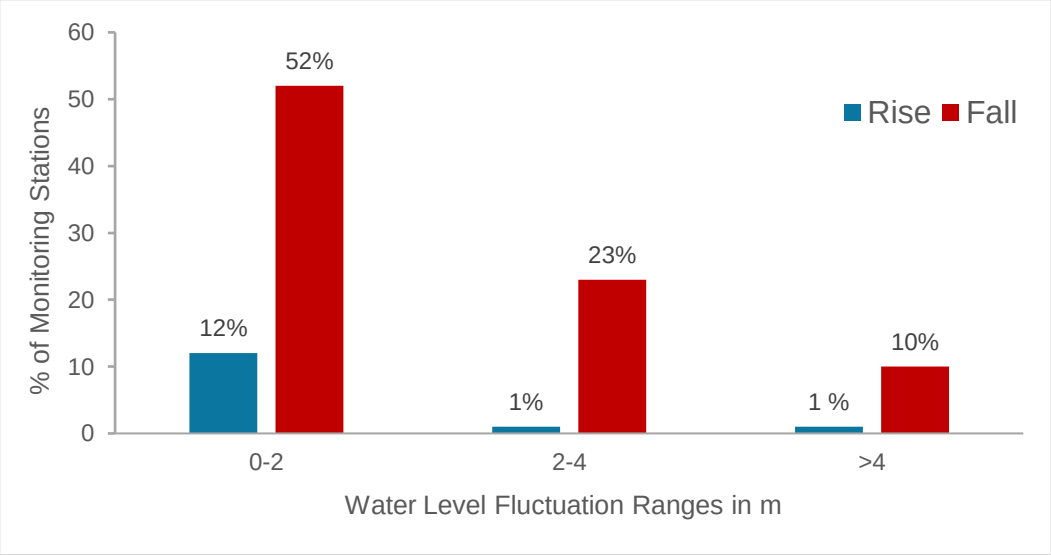


Fig. 6: Percentage of wells showing rise and fall in water level in unconfined aquifer (January 2025 WRT November 2024).

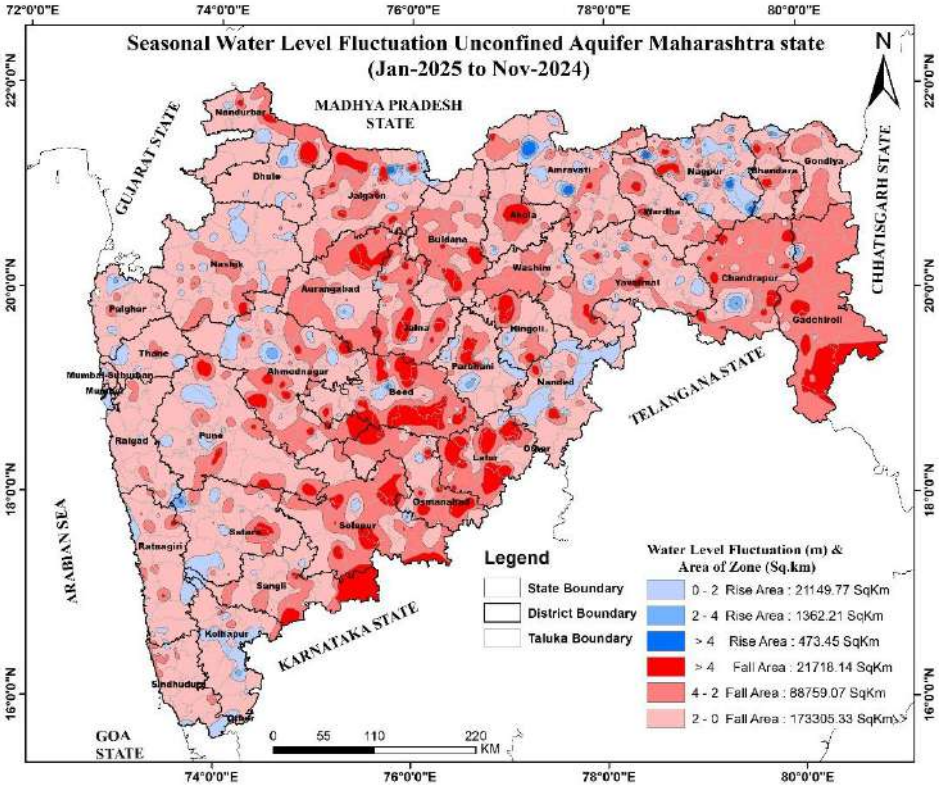


Fig. 7: Seasonal water level Fluctuation in unconfined aquifer (January 2025 WRT November 2024).

Seasonal Fluctuation of Water level in Unconfined Aquifer

(January 2025 WRT May 2024)

Water Levels from 1892 stations were compared with that of May 2024 to know the seasonal changes in ground water in January 2025 and found that ~18% of wells have recorded a rise in water level and the remaining 81% of the wells have recorded a fall in water level. About 1% of the wells showing no fluctuation **(Fig. 8)**.

Rise in Water Levels:

About 81% of wells covering 2,70,451 Km2 show a rise in water level in the range of 0 to > 4 m. Out of which 35.73% of the wells show a rise in water level up to 2m, 22.30% show fall in the range of 2-4 and 23.30% of show a fall in the range of >4 m. Rise in water level is observed in isolated small parts of almost all the districts of state **(Fig.9)**.

Fall in Water Levels:

About 18% of wells covering ~ 36,316 Km2 area show a decline in water level in the range of 0 to >4 m covering major part of the state. Decline in water level < 2 m was observed in 13.80% of wells covering about 3,935 Km2 area. It is observed in major parts of the state. Decline >2m was observed in 2.54% of wells covering 6,339 Km2 area. It is observed in major parts of almost the districts of Gadchiroli, Hingoli, Akola, Jalgaon,

Dhule, Ahmednagar, Solapur, Osmananbad, Latur, Beed, Sangli. Raigad, Ratnagiri and Kolhapur.

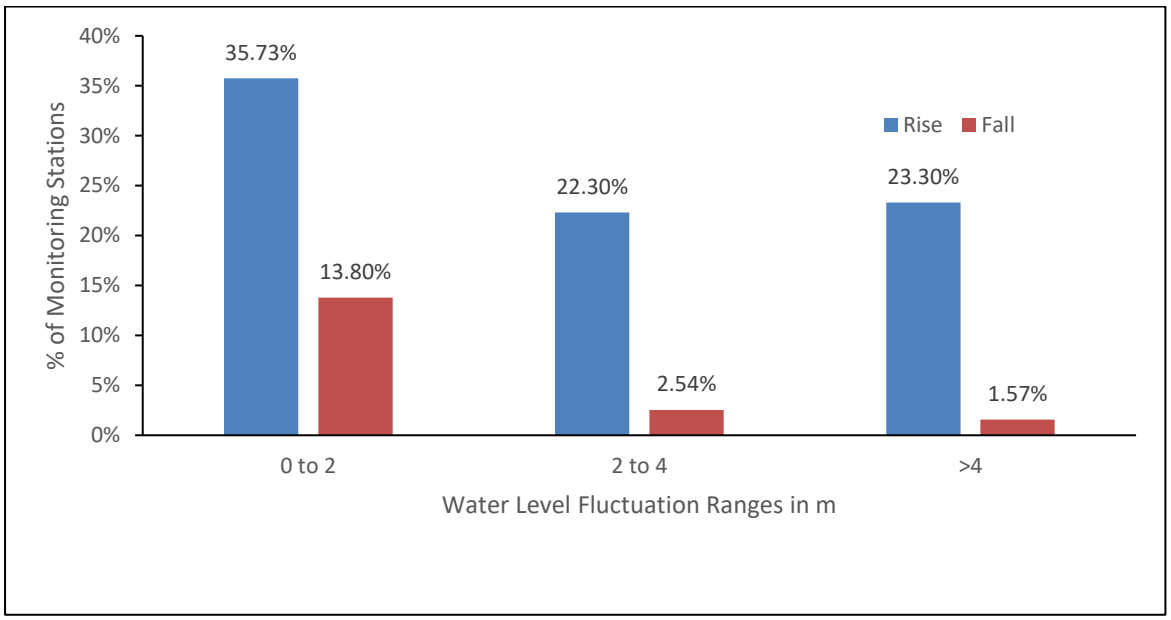


Fig. 8: Percentage of wells showing rise and fall in water level in unconfined aquifer (January 2025 WRT May 2024).

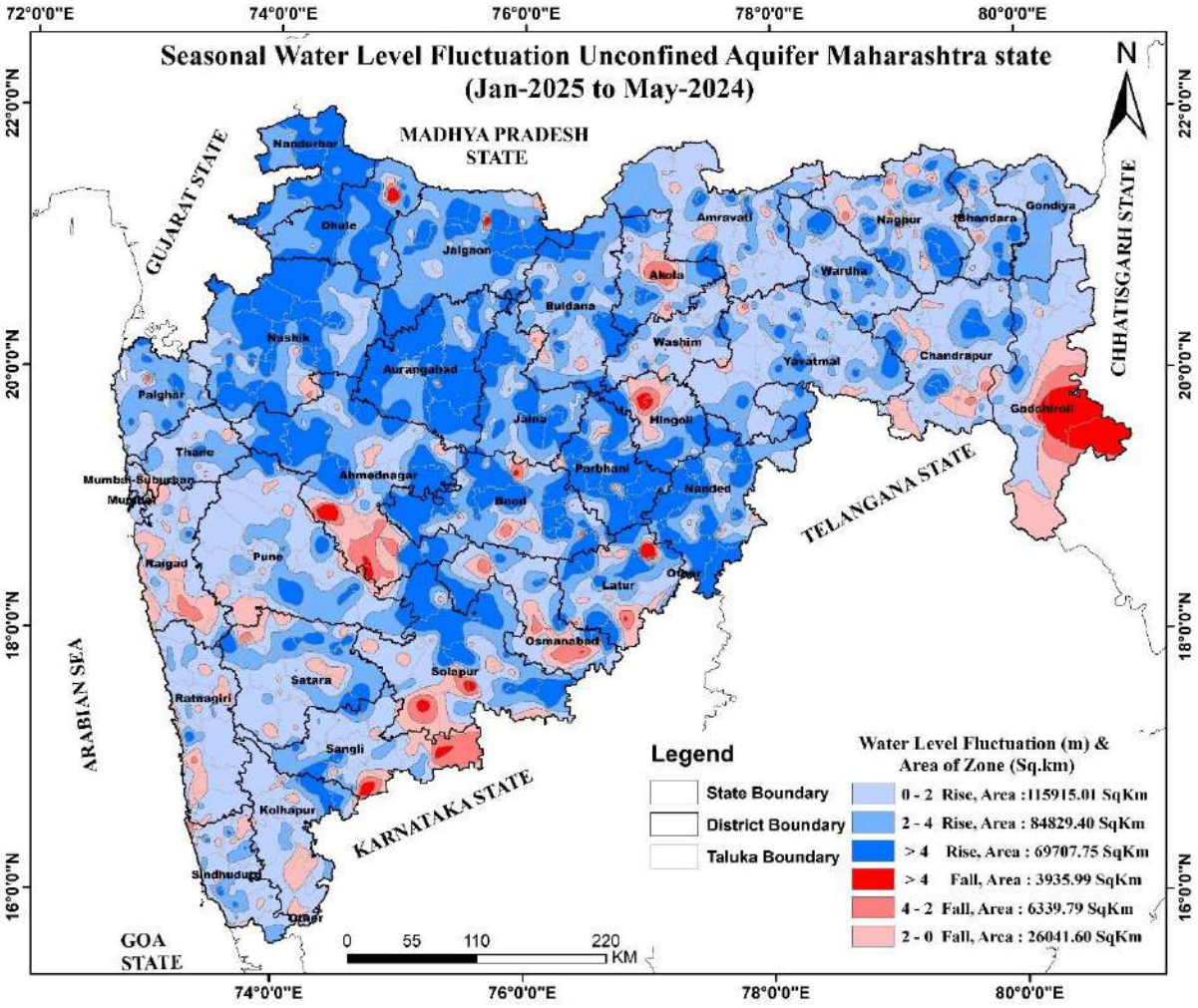


Fig. 9: Seasonal water level Fluctuation in unconfined aquifer (January 2025 WRT May 2024).

Seasonal Fluctuation of Water level in Unconfined Aquifer

(January 2025 WRT August 2024)

Water Levels from 1878 stations were compared with that of August 2024 to know the seasonal changes in ground water in January 2025 and found that ~15% of wells have recorded a rise in water level and the remaining 84% of the wells have recorded a fall in water level. About 1% of the wells showing no fluctuation **(Fig. 10)**.

Rise in Water Levels:

About 84% of wells covering 39,223 Km2 show a rise in water level in the range of 0 to > 4 m. Out of which 10.91% of the wells show a rise in water level up to 2m, 2.20% show fall in the range of 2-4 and 2.09% of show a fall in the range of >4 m. Rise in water level is observed in isolated small parts of almost all the districts of state **(Fig.11)**.

Fall in Water Levels:

About 84% of wells covering ~ 2,67,546 Km2 area show a decline in water level in the range of 0 to >4 m covering major part of the state. Decline in water level < 2 m was observed in 36.72% of wells covering about 1,13,408 Km2 area. It is observed in major parts of the state. Decline >2m was observed in 47.46% of wells covering 1,54,138 Km2 area. It is observed in major parts of almost all districts of the state.

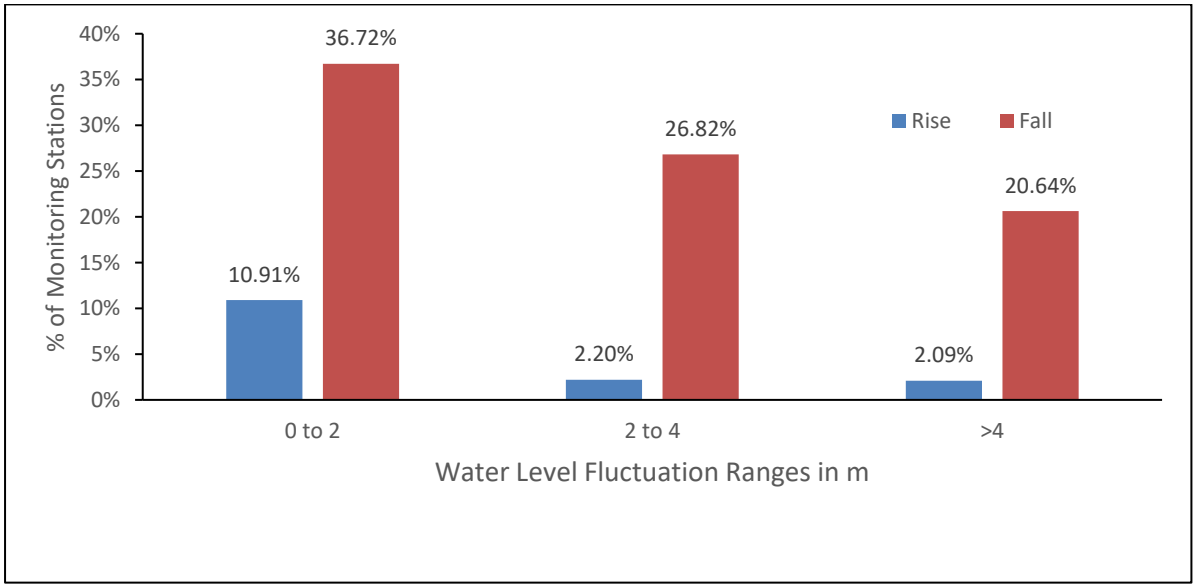


Fig. 10: Percentage of wells showing rise and fall in water level in unconfined aquifer (January 2025 WRT August 2024).

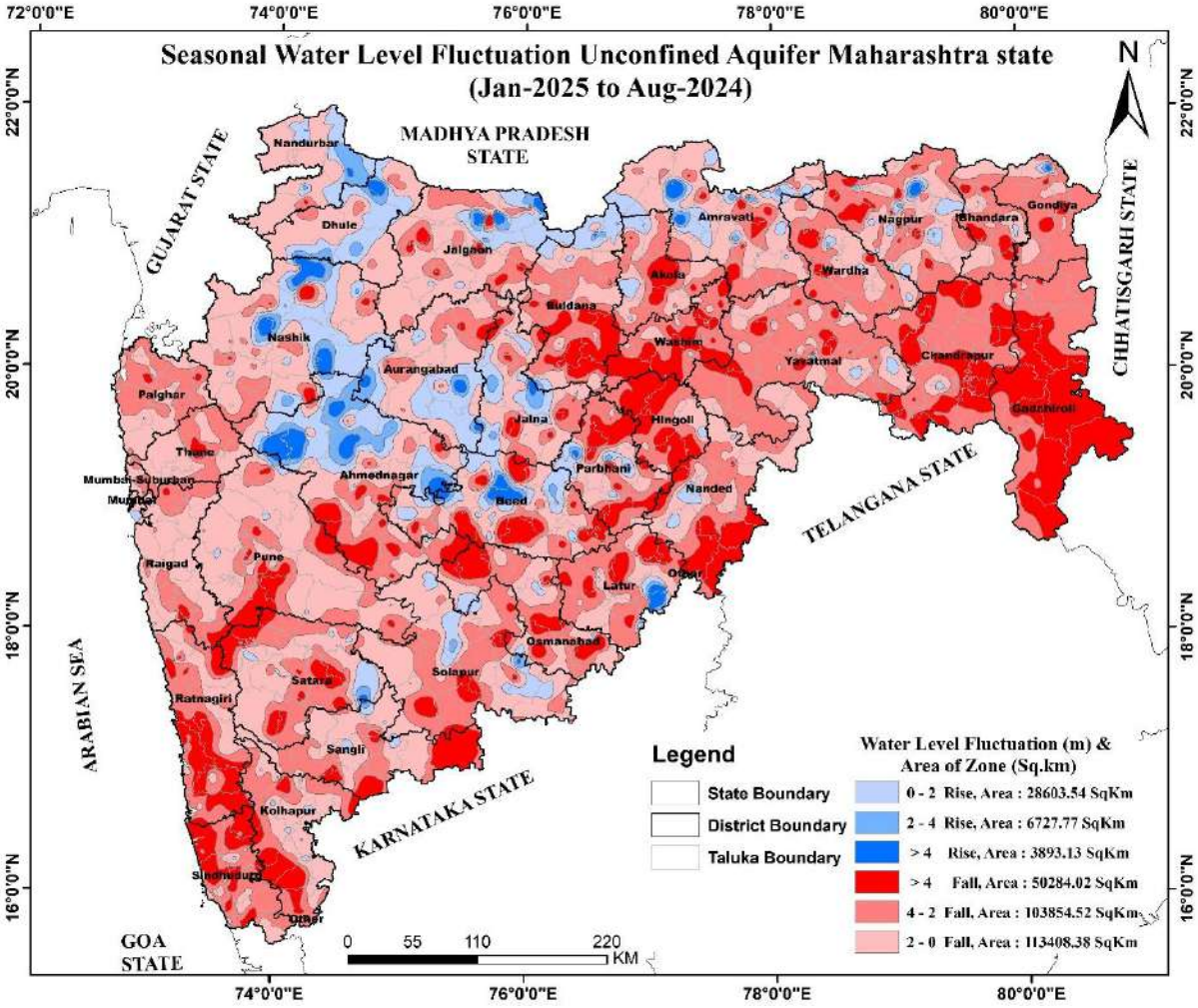


Fig. 11: Seasonal water level Fluctuation in unconfined aquifer (January 2025 WRT Aug 2024).

5.1.3 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer (January 2025 WRT January 2024)

Water Levels from 1891 were compared with that of January 2024 to know the annual changes in ground water in January 2025. Out of total, 53% of wells have recorded a rise in water level and 46% have recorded a fall. About 1% of the wells showing no fluctuation **(Fig. 12)**.

Rise in Water Levels:

~ 53% of wells show a rise in the order of 0 to >4 m and this rise is due to good rainfall received in these areas during 2024. A significant rise in water level > 4 m (~6 % of wells) mainly observed in parts of almost all the districts of Marathwada and Khandesh regions and Solapur and Satara districts of Western Maharashtra region covering ~11,854 sq km area. The rise in water level up to 4 m (47% of wells) covering an area of ~1,68,954 sq km is observed in major parts of almost all the districts of Konkan,

Khandesh, Western Maharashtra and Marathwada region and parts of Amravati, Nagpur, Wardha and Yavatmal districts of Vidarbha region **(Fig. 13)**.

Fall in Water Levels:

About 46 % of wells covering about 1,25,957 Km^2 area in Maharashtra show a decline in water level in the range of 0 to >4 m. Out of which 37 % of wells show a falling water level up to 2m and 6 % of shows fall in the range of 2-4 and 3% of wells show fall in water level >4 m. Decline in water levels up to 2 m is observed mainly in all the districts of Vidarbha region and isolated small parts of remaining all the districts of the state covering 1,104,29 sq km. Decline in water levels > 2 m (15,529 sq km) is observed as isolated small parts of all the districts of the state except Nashik and Nandurbar districts **(Fig. 13)**.

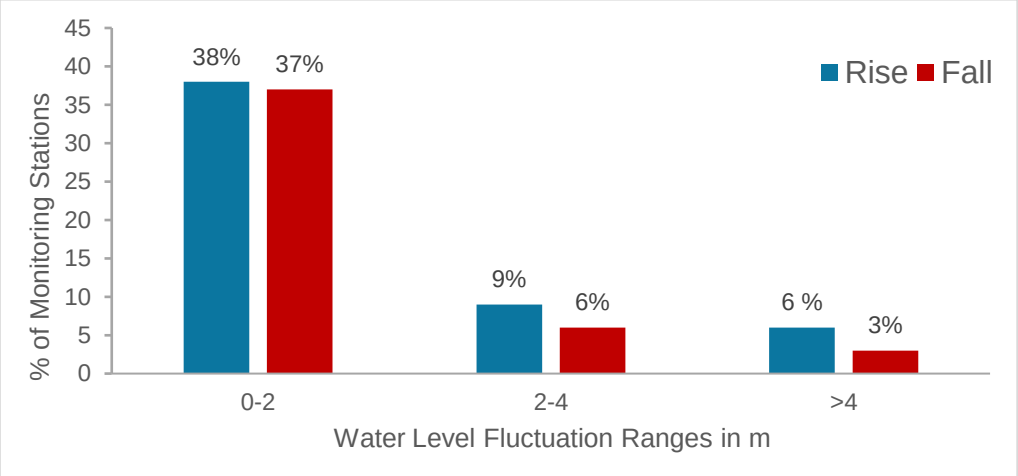


Fig. 12: Percentage of wells showing rise and fall in water level in unconfined aquifer (January 2025 WRT January 2024).

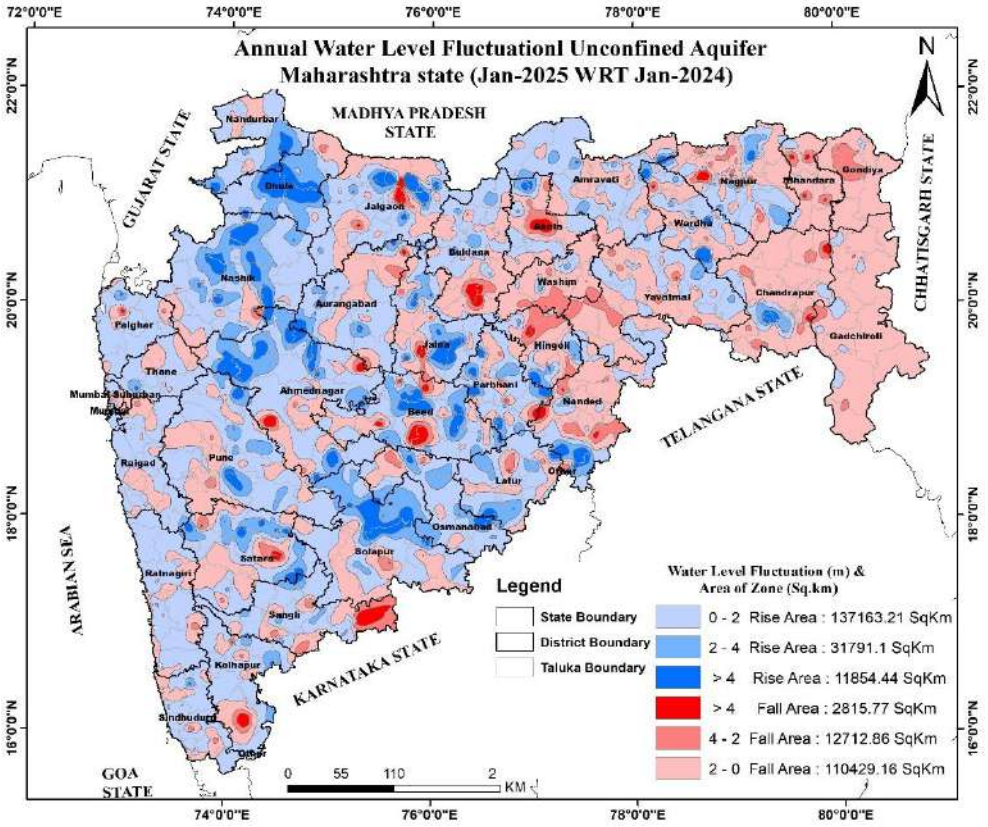


Fig. 13: Annual water level Fluctuation in unconfined aquifer. (January 2025 WRT January 2024)

Annual Fluctuation of Water level in Unconfined Aquifer (January 2025 WRT January 2023)

Water Levels from 1658 stations were compared with that of January 2023 to know the annual changes in ground water in January 2025. Approximately 48% of wells have recorded a rise in water level, the remaining 51% of wells have recorded a fall in water level. About 1% of wells show no fluctuation **(Fig. 14)**.

Rise in Water Levels:

Rise water level of less than 2 m is recorded in 36 % wells, 2 to 4 m in 7% wells and more than 4 m in 5% of wells. The rise in water level up to 2 m (36% of wells) covering an area of ~1,25,095 sq km is observed in major parts of almost all the districts of Konkan, Khandesh and Western Maharashtra region and parts of Wardha, Yavatmal, Washim and Amravati districts of Vidarbha region. Rise in water level (rise > 2 m) was observed in ~12 % of wells covering ~24,925 sq km area is observed as isolated patches in almost all the districts of state except Akola and Raigad districts **(Fig. 15)**.

Fall in Water Levels:

Fall in water level of < 2 m is recorded in 38 % wells, 2 to 4 m in 8% wells and > 4 m in 5% of wells. Fall in water levels < 2 m is observed

1,30,418 sq km covering major parts of almost all the districts of Marathwada and Vidarbha region. Parts of Solapur and Kolhapur districts of Western Maharashtra region Whereas fall between 2 to 4 m and >4 m is observed in isolated parts of almost all the districts of the state except Gondia and Gadchiroli districts covering an area of ~26,334 sq km **(Fig. 15)**.

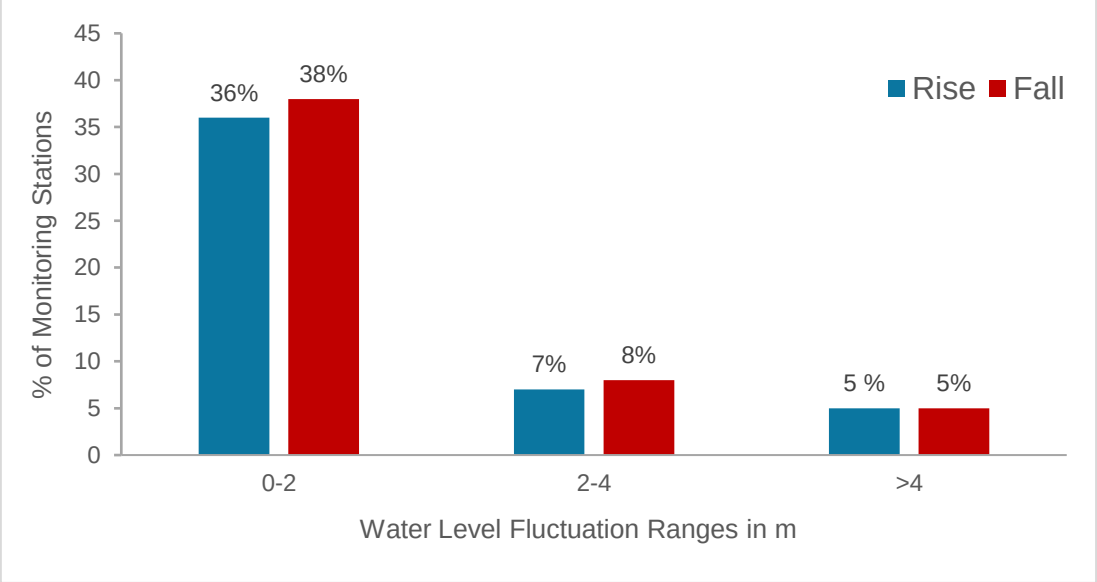


Fig. 14: Percentage of wells showing rise and fall in water level in unconfined aquifer (January 2025 WRT January 2023).

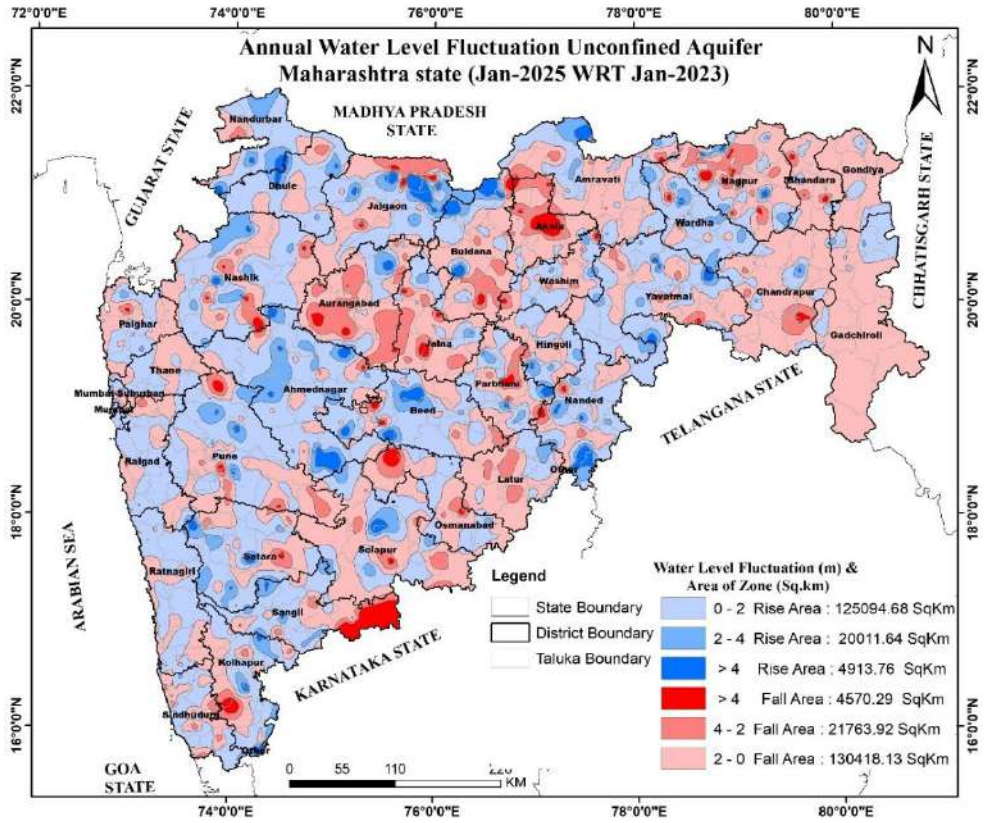


Fig. 15: Annual water level Fluctuation in unconfined aquifer. (January 2025 WRT January 2023)

5.1.4 DECADAL FLUCTUATION IN WATER LEVEL

Decadal Fluctuation of Water level in Unconfined Aquifer (Decadal mean January (2015-2024) WRT January 2025)

The mean ground water levels of 1913 stations for the period of January 2015-24 were compared with ground water level of January 2025. It is observed that 64% have shown a rise in water level and 36% have shown a fall in water level. About 8 wells show no fluctuation **(Fig. 16)**.

Rise in Water Levels:

Rise in water level of < 2 m is recorded in 47 % wells, 2 to 4 m in 12% wells and > 4 m in 5% of wells. Rise in water Level <2 m is observed in major part of the state covering 1,62,481 sq km whereas rise in water level between 2-4 and >4 m has been observed in isolated parts of almost all the districts except Mumbai city, Raigad and Gondia districts covering an area of 47,465 sq km **(Fig. 17)**.

Fall in Water Levels:

Fall in water level of less than 2 m is recorded in 29% wells, 2 to 4 m in 5% wells and more than 4 m in 2% of wells. Fall in water Level <2 m is observed covering 88,369 sq km is observed in major parts of Chandrapur, Gadchiroli, Bhandara, Gondia and Washim districts of Vidarbha region and isolated small parts of almost all the districts of the state. Fall between 2 to 4 m and >4 m is observed in isolated parts of almost all the districts of the state except Wardha, Dhule and Nandurbar districts covering an area of 8450 sq km **(Fig. 17).**

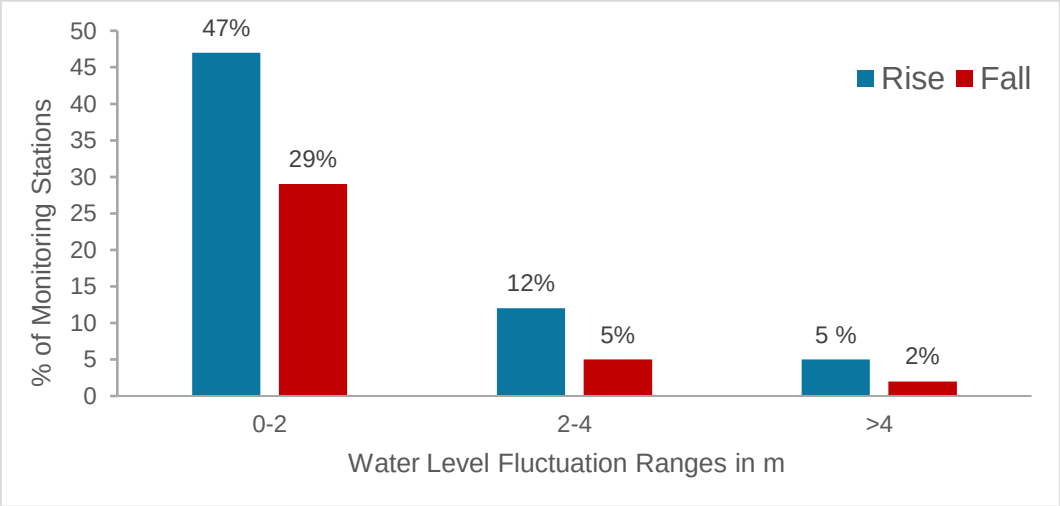


Fig. 16: Percentage of wells showing rise & fall unconfined Aquifer (Decadal Mean January (2015-2024) WRT January 2025).

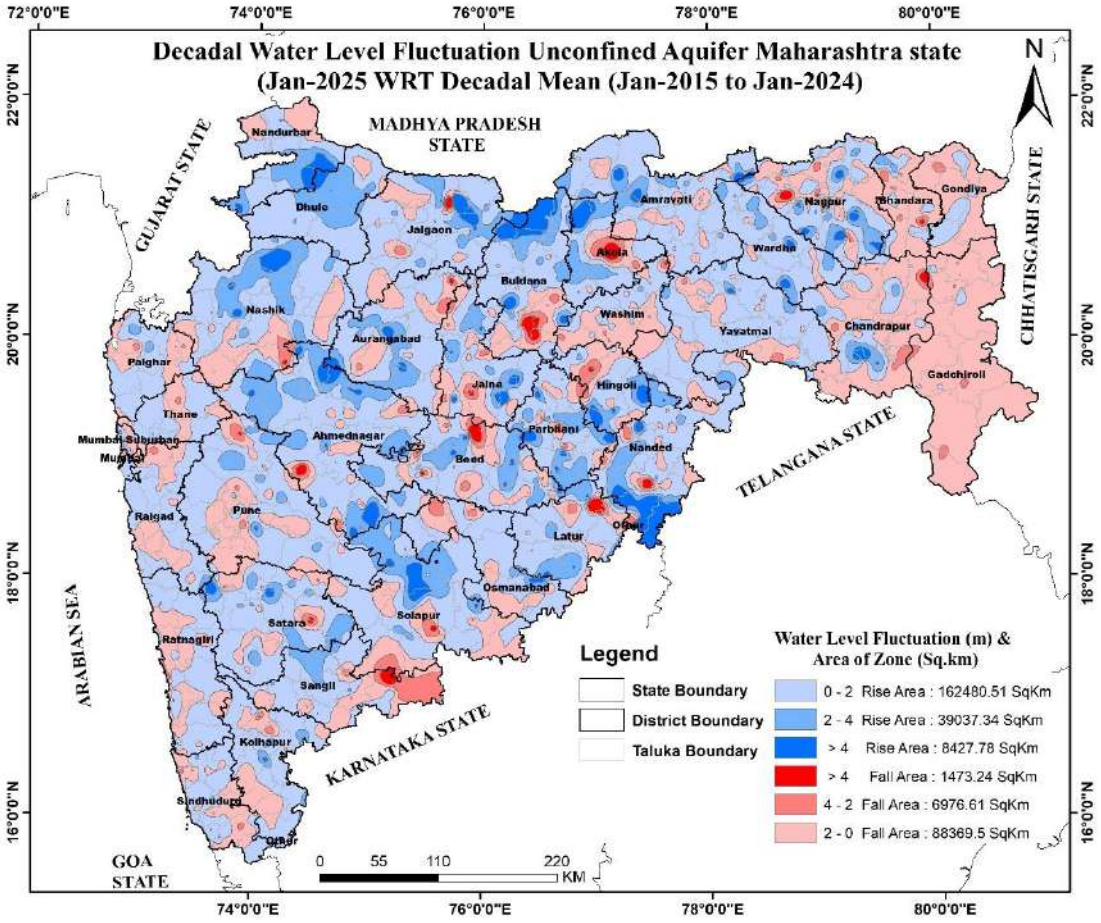


Fig. 17: Decadal Water level fluctuation in unconfined aquifer (Decadal Mean January (2015 -2024) WRT January 2025).

5.2 DEEPER AQUIFER (SEMI-CONFINED/CONFINED)

5.2.1 Depth to Piezometric Level in Semi-Confined/Confined Aquifer (January 2025)

Analysis of piezometric level data of 195 wells shows piezometric level varies between 0.01 mbgl (Buldhana district) to 184.70 mbgl (Ratnagiri district). Piezometric level of less than 2 mbgl is recorded in 10% of wells, between 2 to 5 mbgl in 16%, between 5 to 10 mbgl 33%, between 10 to 20 mbgl in 20%, between 20-40 mbgl in 13%, > 40 is recorded in 8% of wells **(Fig. 18)**.

Shallow piezometric level of < 5 mbgl is noticed mainly in isolated patches of Nagpur, Amravati, Pune, Yavatmal, Aurangabad, Buldhana and Sangli districts covering 13,787 Km^2 area of state. Piezometric level between 5 to 10 mbgl is observed mainly in the eastern and central part of the state covering 1,02,769 Km^2 of Aurangabad, Jalna, Beed, Parbhani, Osmanabad, Nagpur, Bhandara, Wardha, Chandrapur, Yavatmal, Amravati, Ahmednagar, Jalgaon, Dhule, Sangli and Sindhudurg districts. Piezometric level between 10 to 20 mbgl observed in major part of the state covering

1,08,158 Km^2 area. Deeper Piezometric levels 20 to 40 and > 40 mbgl are mainly observed in major parts of all the districts of Konkan region, parts of all the districts of Khandesh region; Kolhapur, Solapur and Sangli district of Western Maharashtra region; Latur district of Marathwada region and Akola, Buldhana, Yavatmal and Gondia districts of Vidarbha region covering 80,637 Km^2 area of the state **(Fig. 19)**.

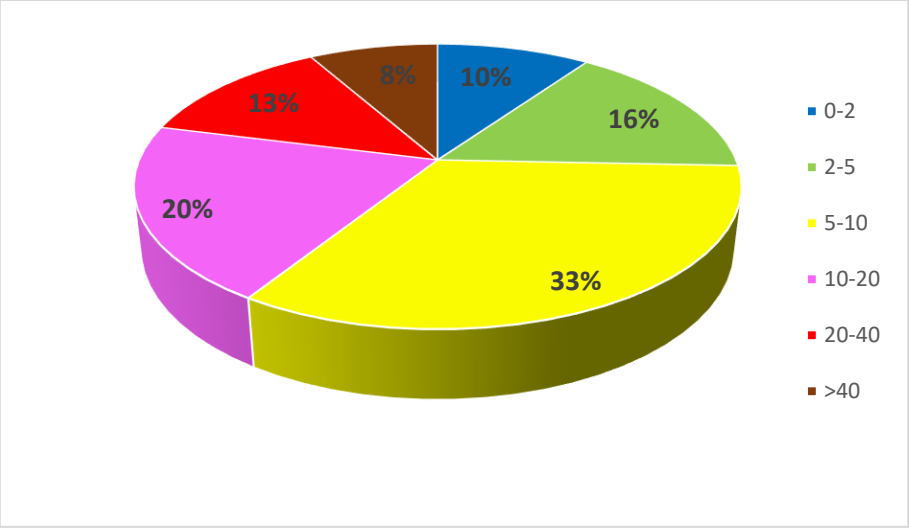


Fig.18: Percentage of wells in different Piezometric Level (January 2025).

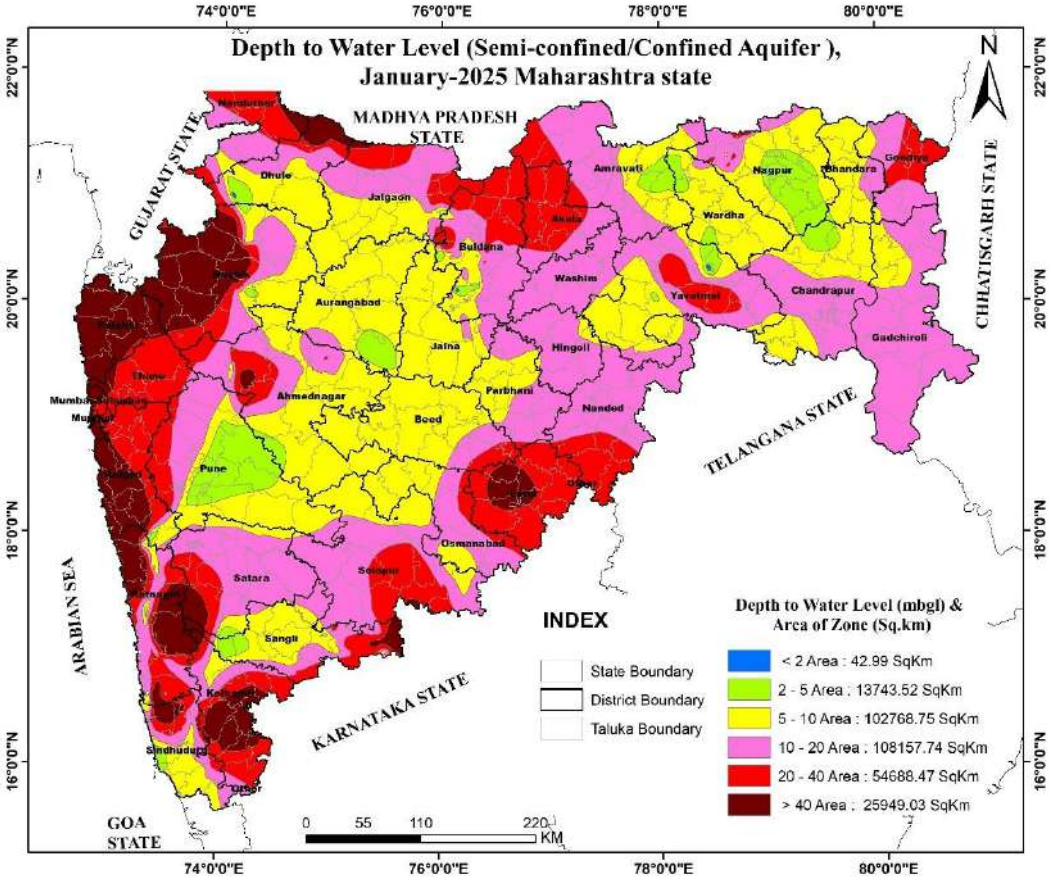


Fig.19: Depth to Piezometric Level in Deeper Aquifer Jan. 2025.

5.2.2 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Seasonal Fluctuation of Piezometric level Semi-Confined/Confined Aquifer (January 2025 WRT November 2024)

Rise in Piezometric Level:

Out of 174 wells analyzed, 19 wells show a rise in water level in the range of 0-2, 2-4 and >4 m. Piezometric water level rise of less than 2 m is recorded in 8 % wells, 2 to 4 m in 1 % wells and more than 4 m in 2 % of the wells. Piezometric level rise of less than 2 m is observed in isolated parts of Nagpur, Nashik, Ratnagiri and Sindudurg districts. Piezometric level of 2 to 4 m and >4 m is observed in isolated part of Sangli, Ahmednagar, Dhule and Solapur districts **(Fig.20).**

Fall in Piezometric Level:

Out of 174 wells analyzed, 155 wells show a fall in water level in the range of 0-2, 2-4 and >4 m. Fall in water level of less than 2 m is recorded in 38 % wells, 2 to 4 m in 25% wells and more than 4 m in 26 % of the wells. Fall of less than 2 m is mainly observed in almost all the districts of the state significantly observed in Buldhana, Ratnagiri, Sindudurg, Sangli, Nagpur, Ahmednagar, Kolhapur and Pune districts. Fall of 2 to 4 m is observed mainly in parts of Buldhana, Nagpur, Sindhudurg, Ratnagiri, Gondia, Solapur, Sangli and Yavatmal and Fall >4 m is observed mainly in parts of Buldhana, Sangli, Ratnagiri, Solapur, Latur, Dhule, Nashik, Nandurbar and Yavatmal districts **(Fig.20)**.

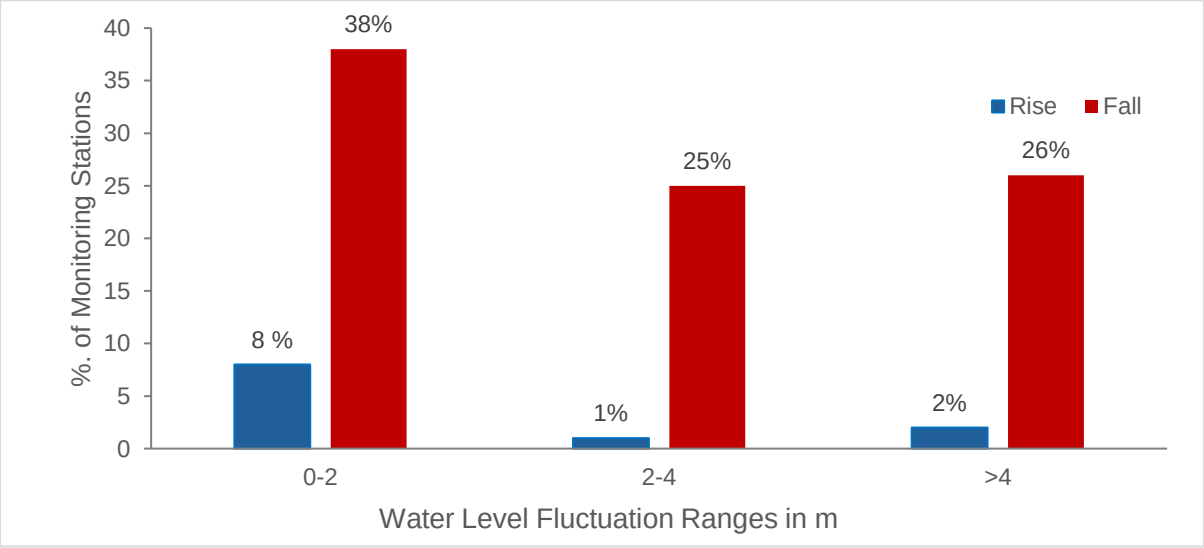


Fig. 20: Percentage of Wells showing rise and fall in Piezometric level in Semi-Confined/Confined Aquifer. (January 2025 WRT November 2024)

Seasonal Fluctuation of Piezometric level Semi-Confined/Confined Aquifer (January 2025 WRT May 2024)

Rise in Piezometric Level:

Out of 173 wells analyzed, 133 wells show a rise in water level in the range of 0-2, 2-4 and >4 m. Piezometric water level rise of less than 2 m is recorded in 23 % wells, 2 to 4 m in 16 % wells and more than 4 m in 40 % of the wells. Piezometric level rise of less than 2 m is observed in isolated parts of Nagpur, Buldhana, Ratnagiri and Sindudurg districts. Piezometric level of 2 to 4 m and >4 m is observed in isolated part of Buldhana, Ratnagiri and Sindudurg districts **(Fig.21).**

Fall in Piezometric Level:

Out of 174 wells analyzed, 38 wells show a fall in water level in the range of 0-2, 2-4 and >4 m. Fall in water level of less than 2 m is recorded in 12 % wells, 2 to 4 m in 4% wells and more than 4 m in 4 % of the wells. Fall of less than 2 m is mainly observed in almost all the districts of the state significantly observed in Buldhana, and Chandrapur districts. Fall of 2 to 4 m and > 4 m Akola, Nagpur and Sangli districts **(Fig.21)**.

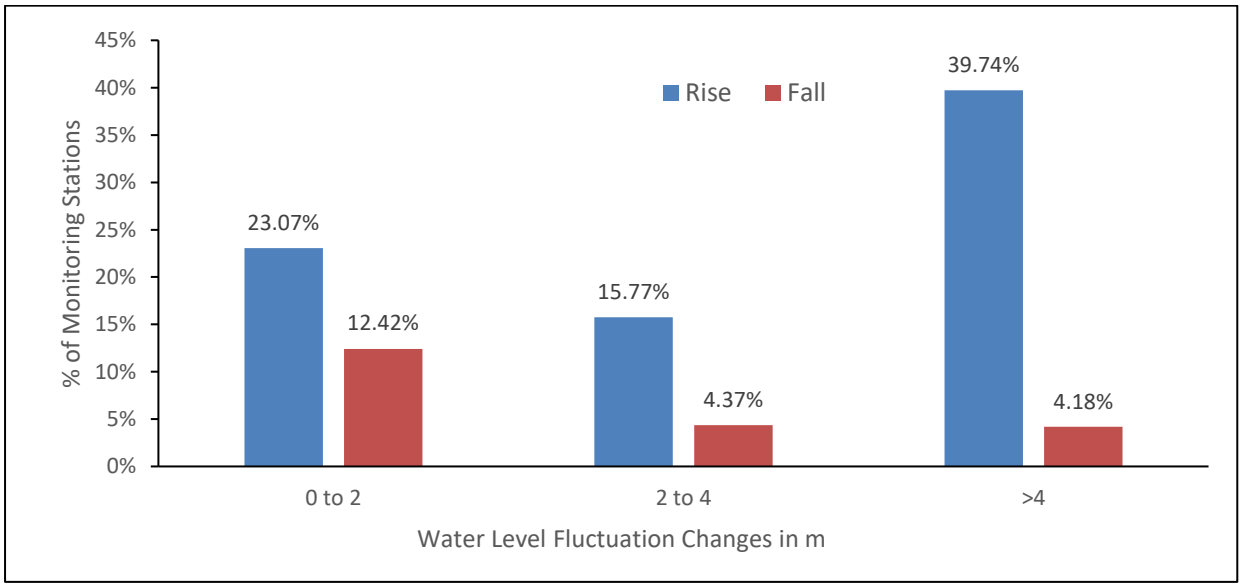


Fig. 21: Percentage of Wells showing rise and fall in Piezometric level in Semi-Confined/Confined Aquifer. (January 2025 WRT May 2024)

Seasonal Fluctuation of Piezometric level Semi-Confined/Confined Aquifer (January 2025 WRT August 2024)

Rise in Piezometric Level:

Out of 172 wells analyzed, 25 wells show a rise in water level in the range of 0-2, 2-4 and >4 m. Piezometric water level rise of less than 2 m is recorded in 6 % wells, 2 to 4 m in 4 % wells and more than 4 m in 5 % of the wells. Piezometric level rise of less than 2 m is observed in isolated parts of Buldhana, Ahamadnagar and Jalgaon, districts. Piezometric level of 2 to 4 m and >4 m is observed in isolated part of Dhule, Latur, and Sangli districts **(Fig.22).**

Fall in Piezometric Level:

Out of 174 wells analyzed, 147 wells show a fall in water level in the range of 0-2, 2-4 and >4 m. Fall in water level of less than 2 m is recorded in 25 % wells, 2 to 4 m in 19% wells and more than 4 m in 42 % of the wells. Fall of less than 2 m is mainly observed in almost all the districts of the state significantly observed in Akola. Amravati Chatrapati Sambhaji Nagar and Solapur districts. Fall of 2 to 4 m is observed mainly in parts of Buldhana, Kolhapur, Sangli, Sindudurg and Yevatmal and Fall >4 m is observed mainly in parts of Ahamadnagar, Buldhana, Gondia, latur, Sangli, Sindudurg, and Yavatmal districts **(Fig.22)**.

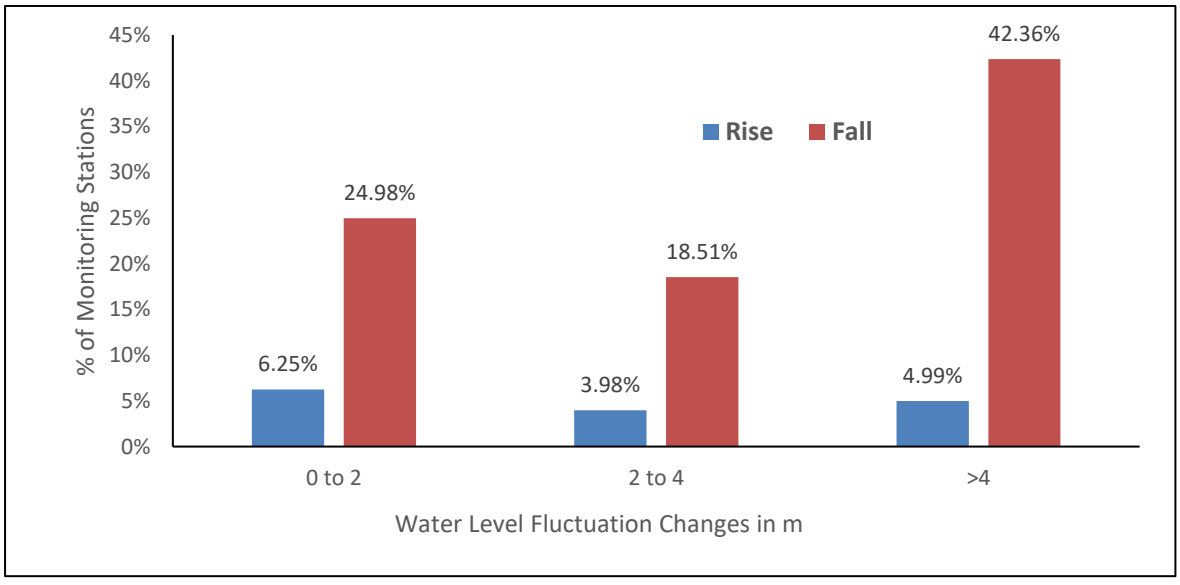


Fig. 22: Percentage of Wells showing rise and fall in Piezometric level in Semi-Confined/Confined Aquifer. (January 2025 WRT Aug 2024)

5.2.3 ANNUAL FLUCTUATION IN PIEZOMETRIC LEVEL

Annual Fluctuation of Piezometric level in Semi Confined/Confined Aquifer (January 2025 WRT January 2024)

Rise in Piezometric Level:

Out of 157 Wells analyzed, 84 wells show rise in water level in the range of 0-2, 2-4 and >4 m.

piezometric water level rise of less than 2 m is recorded in 32 % wells, 2 to 4 m in 7% wells and more than 4 m in 15% of the wells. Piezometric level rise of less than 2 m is seen in almost all the districts, significantly in Buldhana, Ratnagiri, Sindudurg, Sangli, Dhule, Kolhapur and Nagpur districts. Piezometric level of 2 to 4 m is observed mainly in isolated parts of Aurangabad and Sangli districts. A piezometric level rise of more than 4 m is observed mainly in parts of Buldhana, Sangli, Dhule, Ratnagiri and Solapur districts **(Fig.23)**.

Fall in Piezometric Level:

Out of 157 Wells analysed, 73 wells show fall in water level in the range of 0-2, 2-4 and >4 m. Fall in water level of less than 2 m is recorded in 30% wells, 2 to 4 m in 7% wells and more than 4 m in 9% of the wells. Fall of less than 2 m is mainly observed in almost all the districts, significantly in parts of Buldhana, Ratnagiri and Yavatmal districts. Fall of 2 to 4 m is observed in isolated parts of Buldhana, Akola, Gondia, Ratnagiri and Solapur districts. Fall >4 m is observed mainly in parts of Sangli, Ratnagiri, Ahmednagar and Yavatmal districts **(Fig.23)**.

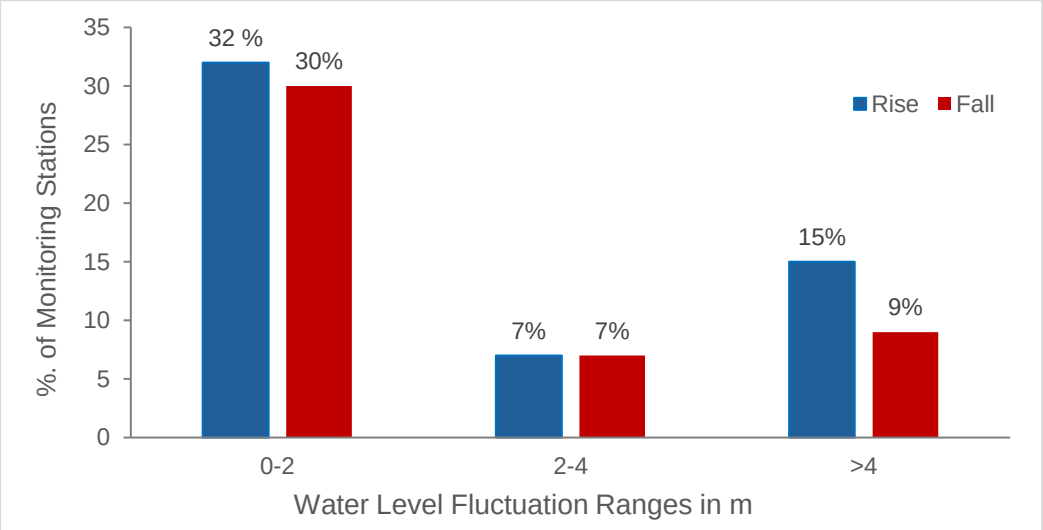


Fig.23: Percentage of Wells showing rise and fall in Piezometric level in Semi -Confined/Confined Aquifer. (January 2025 WRT January 2024)

Annual Fluctuation of Piezometric level in Semi Confined/ Confined Aquifer (January 2025 WRT January 2023)

Rise in Piezometric Level:

Out of 57 Wells analysed, 26 wells show a rise in water level in the range of 0-2, 2-4 and >4 m.

Piezometric water level rise of less than 2 m is recorded in 34% wells, 2 to 4 m in 5 % wells and more than 4 m in 7% of the wells. Piezometric level rise of less than 2 m is seen in almost all the districts, significantly in Yavatmal, Dhule, Jalgaon, Kolhapur and Osmanabad districts. Piezometric level of 2 to 4 m is observed in isolated parts of Ahmednagar, Gondia and Jalgaon districts. Piezometric level rise of more than 4 m is observed in isolated parts of Buldhana, Jalgaon, Satara and Solapur districts **(Fig.24).**

Fall in Piezometric Level:

Out of 57 Wells analysed, 31 wells show fall in water level in the range of 0-2, 2-4 and >4 m. Fall in water level of less than 2 m is recorded in 19% wells, 2 to 4 m in 12% wells and more than 4 m in 23% of the wells. Fall of less than 2 m is observed in isolated parts of Akola, Aurangabad, Nasik, Dhule, Gondia, Yavatmal, Gadchiroli, Pune, Raigad and Solapur districts. Fall of 2 to 4 m is observed mainly in parts of Nashik and Parbhani districts. Fall >4 m is observed mainly in parts of Ahmednagar, Latur, Nandurbar and Solapur districts **(Fig.24)**.

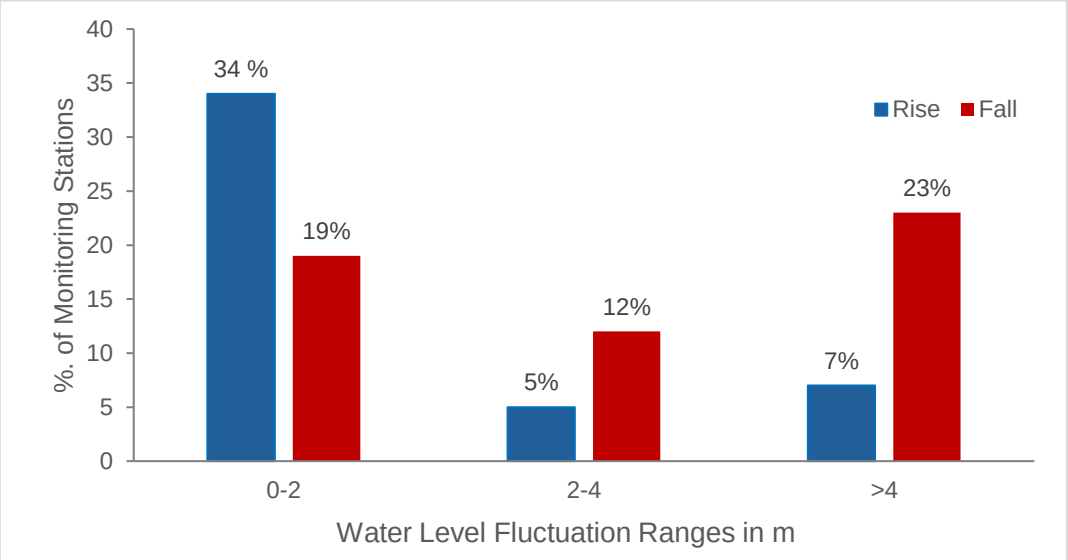


Fig.24: Percentage of Wells showing rise and fall in Piezometric level in Semi Confined/Confined Aquifer. (January 2025 WRT January 2023)

5.2.4 DECADAL FLUCTUATION IN PIEZOMETRIC LEVEL

Decadal Fluctuation of Piezometric level in Semi-Confined/Confined Aquifer (January (2015-2024) WRT January 2025)

Out of 163 Wells analysed, 53 % (87 wells) wells show Rise in water level and 45 % (73 wells) wells show fall in water level in the range of 0-2, 2-4 and >4 m. ~2% of the wells (3 wells) has shown no fluctuation **(Fig. 25)**.

Rise in Piezometric Level:

Piezometric water level rise of < 2 m is recorded in 31 % wells, 2 to 4 m in 6 % wells and more than 4 m in 16 % of wells. Piezometric level rise of less than 2 m is observed significantly in Buldhana, Ratnagiri, Sindudurg, Sangli, Nashik, Dhule, Jalgaon, Kolhapur and Yavatmal districts. Piezometric levels of 2 to 4 m are observed mainly in parts of Ahmednagar and Sangli districts. A piezometric level rise of more than 4 m is observed mainly in parts of Sangli, Buldhana, Nagpur, Ratnagiri, Dhule and Latur districts.

Fall in Piezometric Level:

Fall in water level of < 2 m is recorded in 26 % wells, 2 to 4 m in 7% wells and > 4 m in 12% of wells. Fall of < 2 m is mainly observed in parts of Buldhana, Ratnagiri, Nagpur, Sangli, Sindhudurg, Solapur, Chandrapur and Yavatmal districts. Fall of 2 to 4 m is observed in isolated parts of Buldhana, Solapur, Gondia, Dhule and Nandurbar districts. Fall >4 m is observed in parts of Ratnagiri, Sangli, Yavatmal and Ahmednagar districts.

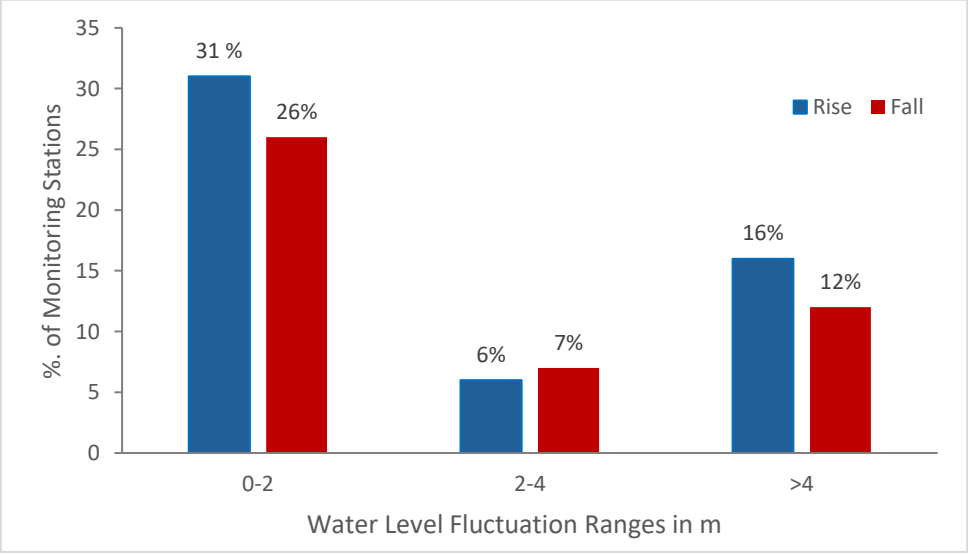


Fig. 25: Percentage of Wells showing rise and fall in Piezometric level in Semi -Confined/Confined Aquifer (Decadal mean January (2015-24) WRT January 2025)

6.0 SUMMARY

The groundwater levels in the state are monitored through a network of 2175 wells four times a year: August, January and May and this report evaluates groundwater levels during January-2025.

Un-confined (Shallow) Aquifer:

- The water levels from both un-confined (Shallow Aquifer) and confined/semi-confined (Deeper Aquifer) are analyzed for their distribution with different ranges and also compared with annual and decadal water levels.
- During this season, in shallow aquifer water levels are in the range of 0.01 to 48.80 mbgl and the more predominate water level range is 5-10 and 2-5 m, which occupies about 1,49,555 sq km and 1,24,271 sq.km of states geographical area respectively and in 80% of wells. Shallowest levels were observed in Pune district, while the deepest in Jalgaon district. In most coastal regions, water levels are very shallow (0-2 and 2-5 mbgl). In the northern part of the state covering Tapi-Purna alluvium deeper water levels (>10 m) are observed.
- The seasonal fluctuations in water levels during January-25 with respect to November-24 shows that 85% of wells have shown a fall in water levels covering major part of the state.
- The annual fluctuations during January-25 WRT to January-24, 53% of wells shown rise in water levels in the ranges of 0-2,2-4 and > 4 m and fall in water levels is observed in about 46 % of wells. The rise mostly occurred in is observed in major parts of almost all the districts of Konkan, Khandesh, Western Maharashtra and Marathwada regions and fall in water level mostly observed in almost all the districts of Vidarbha region.
- The annual fluctuations during January-25 WRT to January-23, show 48 % rise in water levels in the range of 0-2,2-4 and > 4 m and 51 % of wells fall in water levels. Rise in water level mostly observed in major parts of almost all the districts of Konkan, Khandesh and Western Maharashtra regions and fall in water level is observed in parts of almost all the districts of Marathwada, Vidarbha regions and Solapur and Kolhapur districts of Western Maharashtra region.
- The decadal fluctuations in water levels during January-25 with respect to last decade (2015-24) of the same season shows rise in 64% of wells, Rise in water level is observed in major part of the state. Fall in water levels is observed in 36 % of wells and a Decline of > 2 m is observed in isolated parts of almost all the districts of the state except Wardha, Dhule and Nandurbar districts covering an area of 8199 sq km.

Semi-confined/Confined Aquifer (Deeper Aquifer):

- In deeper aquifers (semi-confined/ confined) Piezometric Levels are in the range of 0.01 to 184.70 mbgl, shallowest in Buldhana and deepest in Ratnagiri district.
- The seasonal fluctuations in Piezometric Levels during January-25 with respect to November-24 shows that 89 % of wells have shown fall in Piezometric Levels and 11% of wells show Rise in Piezometric Levels.
- The annual fluctuations during January-25 WRT January-24 show rise in Piezometric Levels in the range of 0-2,2-4 and > 4 m in 54 % of wells and fall in Piezometric Levels is observed in about 46 % of wells.
- The annual fluctuations during January-25 WRT January-23 show rise in Piezometric Levels in the range of 0-2,2-4 and > 4 m in 46 % of wells and fall in Piezometric Levels is observed in about 54 % of wells.
- The decadal fluctuations during January-25 WRT January-2015-24, show rise in Piezometric Levels in the range of 0-2,2-4 and > 4 m in 53 % of wells and fall in Piezometric Levels is observed in about 45 % of wells.

Recommendations:

- Analysis of groundwater scenario of Maharashtra reveals that the dynamics of groundwater is highly related with the variation in rainfall. Hence the following recommendations are submitted:
- To sustain Monsoon Recharge, efforts must be made to harvest rainwater through check dams, percolation tanks at sites highlighted in Artificial Recharge Master Plan. And also protect and enhance natural recharge zones identified in District Recharge Plan to retain monsoon benefits.
- Promote efficient micro-irrigation techniques like drip and sprinkler irrigation to reduce groundwater extraction and encourage farmers to grow less water-intensive crops in drought-prone regions of Maharashtra. Adopt crop diversification to shift from high-water-consuming crops (paddy, sugarcane) to drought-resistant crops.
- In deep water level zones (>20m), enforce strict regulations on dependency on borewell by implementing incentives for sustainable practices. In Urban areas, dependency on deeper aquifers has to curb by improving surface water supply for domestic use. Promote the reuse of treated water for non-potable purposes to lessen groundwater exploitation.
- Promote afforestation in depleted regions to improve soil moisture retention and groundwater recharge. Select native tree species with

deep root systems to enhance percolation and groundwater sustainability.

- Escalate Community Awareness programs to educate farmers and industries on water-efficient practices. Establish community water conservation groups to encourage participatory groundwater management.